GOVERNMENT OF INDIA.

REVENUE AND AGRICULTURAL DEPARTMENT.

WEATHER SUMMARY FOR JUNE 1888.

The month under review is meteorologically one of the most important throughout the year.

It usually sees the commencement of the rains over almost the whole of India and the relative distribution and copiousness of the total monsoon rainfall cannot infrequently be gauged from the rainfall of this month. The setting in of the rains is normally a very different phenomenon on the Bengal side to what it is on the western side of India.

In the former region the change to the wet season takes place on the whole gradually. The southerly winds which blow in from the Bay and pass as east and south-east winds along the face of the mountain belt become steadily damper and cooler, and finally a rush of saturated air coming from the far south spreads over the greater part of Northern India and the change to the rains is completed

In Lower Bengal the rains usually set in about the second week in June, in the North-Western Provinces sometime during the latter half of the month, and in the Punjab hardly before July. On the West Coast the setting in of the rainy season is usually more sudden and more striking. A slight but important change in the wind direction takes place in the shape of a shift from about west-north-west to west-south-west, and a strong, cool and saturated current suddenly replaces the moderate and warm wind which has previously prevailed. The admixture of the two currents usually results in great electrical disturbance, and as the monsoon travels up the West Coast its appearance is accompanied by severe thunder-storms. The rains ordinarily commence in Ceylon in the middle of May and reach Bombay about the 5th of June. On the present occasion the setting in of the rains has been accompanied by several abnormal features, which apparently have been principally attributable to unusual conditions over the Bay of Bengal. The distributions of pressure and of temperature and the prevailing direction of the winds in the months preceding that in which the rains ordinarily appear had all been such as to promise an early and good monsoon, and the weather experienced over India during the first ten days of the month went far to fulfil this promise. During these ten days rain in fairly large amounts fell all along the West Coast and around the shores of the Gulf of Martaban, and showers in the Central Provinces and in Upper Burmah, while in Bengal and Assam there was general though slight rain and in Upper India frequent falls and all the appearance of the monsoon. These favourable conditions did not, however, last beyond the first ten days. On the 11th there was hardly any indraught of monsoon winds into Northern India. A moderate south-westerly and westerly winds blew on the West Coast, and passed over the Peninsula and the Central Provinces, giving light showers to those regions; but over the Bay the wind's direction was also westerly and south-westerly without any tendency to draw into south and south-east at the head of the Bay as is normally the case and in consequence all the rain due to this current fell in Burmah and Arakan. Such conditions are not only unfavourable to rain-fall in Bengal and Upper India, but exert a detrimental effect on the West Coast current also, so that the succeeding days showed a decrease in the extent and amount of the rainfall derived from the Bombay branch of the monsoon, though there was at no time such an entire failure of the rains in Western as occurred in Northern India.

On the disappearance of the damp south-easterly winds which blew up the Gangetic plain between the 1st and the 10th or 11th of the month, a period of calms and variable airs commenced over Northern India. These lasted until the 13th, after which the north-westerly winds which are characteristic of the hot season set in, and lasted with some temporary interruptions until the 26th. During this period the only rain which fell over North-Western and Northern India occurred during dust or thunderstorms, and was in no way connected with the monsoon. During the same period the air motion was generally feeble and irregular on the West Coast, and though the current from the Bombay side penetrated into the Central Provinces, and gave some rain there, the amounts were generally abnormally small and insignificant. In fact the only region in which rain fell to any extent was Burmah, where some fairly large amounts were recorded.

Owing to the cessation of the rains in Northern India and the appearance there of the north-westerly winds above alluded to, very high temperatures were experienced over that part of India. The thermometer began to rise quickly directly the rain ceased, and by the 13th or 14th excessive temperatures were reported from Bengal. At this time the temperature in Bengal was higher than it had been for many years past, and the heat all over Orissa and Lower and West Bengal was most exceptional. This area of excessively high temperature apparently travelled slowly up the Gangetic plain and Allahabad, Agra, Delhi, Lahore, and finally Peshawar experienced one after the other excessive heat.

The following table which gives the highest maxima, and the date of their occurrence for several stations in Northern India shows the progress north-westward of this wave of heat :

Stations.	Highest maximum recorded.	Mean temperature of same day.	Relative humidity of same day.	date.
Calcutta	106·8	95·7	61	14th
Burdwan	108·7	96·6	55	14th
Benares	114·3	101·8	30	23rd
Allahabad	114·2	103·1	35	23rd
Delhi	114·0	103·6	37	25th
Ludhiana	112·8	100·0	32	25th
Peshawar	118·0	99.9	44	27th

This table shows very clearly the intense heat which prevailed at this time. The highest maximum reported was 118° at Peshawar, but relatively cool nights were experienced at this station, and the mean temperature for the 24 hours was lower than at the stations in the North-Western Provinces and the south-east of the Punjab, where the actual maxima were lower. The highest mean temperatures were at Allahabad and Delhi. In Bengal both the maxima and the daily means were lower than at stations further to the north-westward, but the heat appears to have been more trying in Bengal than elsewhere, partly probably on account of its unusualness and partly on account of the relatively high state of humidity in the atmosphere.

As mentioned above, the north-westerly winds and dry weather lasted roughly until the 26th. On that day a change which had been slowly developing began to affect the weather. This change came from the western side of India. The force of the monsoon began to steadily increase from Ceylon northward as far as Sind, and the current gradually extended into the Central and North-West Provinces. It occasioned rain over these regions, and by the 28th was blowing along the face of the North-West Himalayas as a south-east wind and brought up rain as far as the east of the Punjab. On the West Coast this increase in the strength and depth of the monsoon current was accompanied by heavy falls of rain, and the general appearance of the weather at the close of the month was more promising than it had been at any time since the withdrawal of the monsoon in the early days o the month.

The concluding table shows very clearly the general feebleness of the monsoon during the past month. Only in the districts of Assam, the Berars, the Konkan, Malabar, Burmah, and Ceylon was the monthly average rainfall exceeded ; in all other districts it was in defect. The greatest deficiency was in Northern India and more especially in Bengal and Orissa. In Northern Bengal the total rainfall was only 4 inches instead of the normal 18 inches ; in Lower Bengal it was 4 inches instead of the normal 12 inches, and in Orissa 2½ inches instead of 7 inches. In many other districts the defect was nearly as large, and in Sind there was no rain whatever.

The following table shows the amount of rain and the difference from the average during the month of June, 1888, according to districts, as far as is indicated by the telegraphic reports :

Districts.	No. of Stations.	Average rainfall in June.	Difference from the average in June 1888.
Punjab, West	7	1·49	—0·82
„ East	4	3·96	—1·09
North-Western Provinces, Trans-Gangetic	9	6·16	—3·44
„ „ Cis-Gangetic	3	3·83	—2·42
Behar	2	6·64	—4·18
Northern Bengal	2	17·99	—14·06
Assam, Cachar	3	19·89	+7·97
Lower Bengal—Chutia Nagpur	7	12·36	—8·07
Orissa, Northern Circars	6	6·99	—4·52
Central Provinces, South	7	8·80	—3·97
Berar—Khandeish	2	6·06	+1·29
Rajputana, Central India—Saugor, and Nerbudda. ..	8	4·85	—2·41
Sind—Cutch	3	0·22	—0·22
Guzerat	3	5·68	—1·60
Konkan	4	22·19	+1·71
Deccan—Hyderabad	5	5·28	—0·71
Malabar	4	32·23	+10·93
Mysore—Bellary	4	2·94	—1·01
Carnatic	6	1·79	—0·64
Lower Burma	7	25·46	+5·65
Ceylon	2	8·17	+2·43

SIMLA,
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for *Offg. Meteorological Reporter to the Govt. of India.*